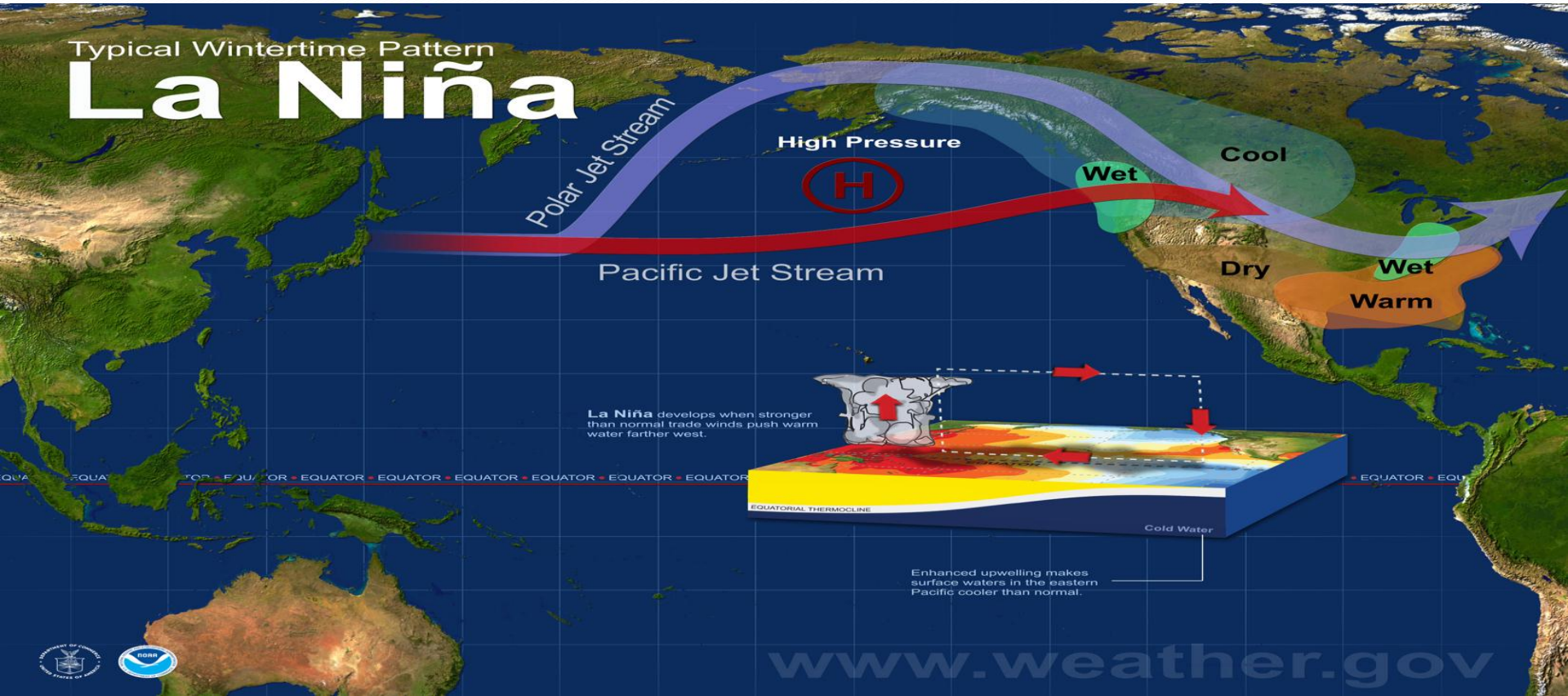
La Niña and its effects on San Diego California

Study conducted by NWS meteorologist James Thomas



OVERVIEW

La Niña is a ocean phenomenon that refers to the irregular cooling in the sea surface temperatures from the coasts of Peru and Ecuador to the equatorial central Pacific. These conditions can indirectly alter the location of the jet streams, thereby affecting the weather pattern around the globe. This study was conducted to find if a correlation exists between San Diego's yearly rainfall and varying strengths of La Niña.

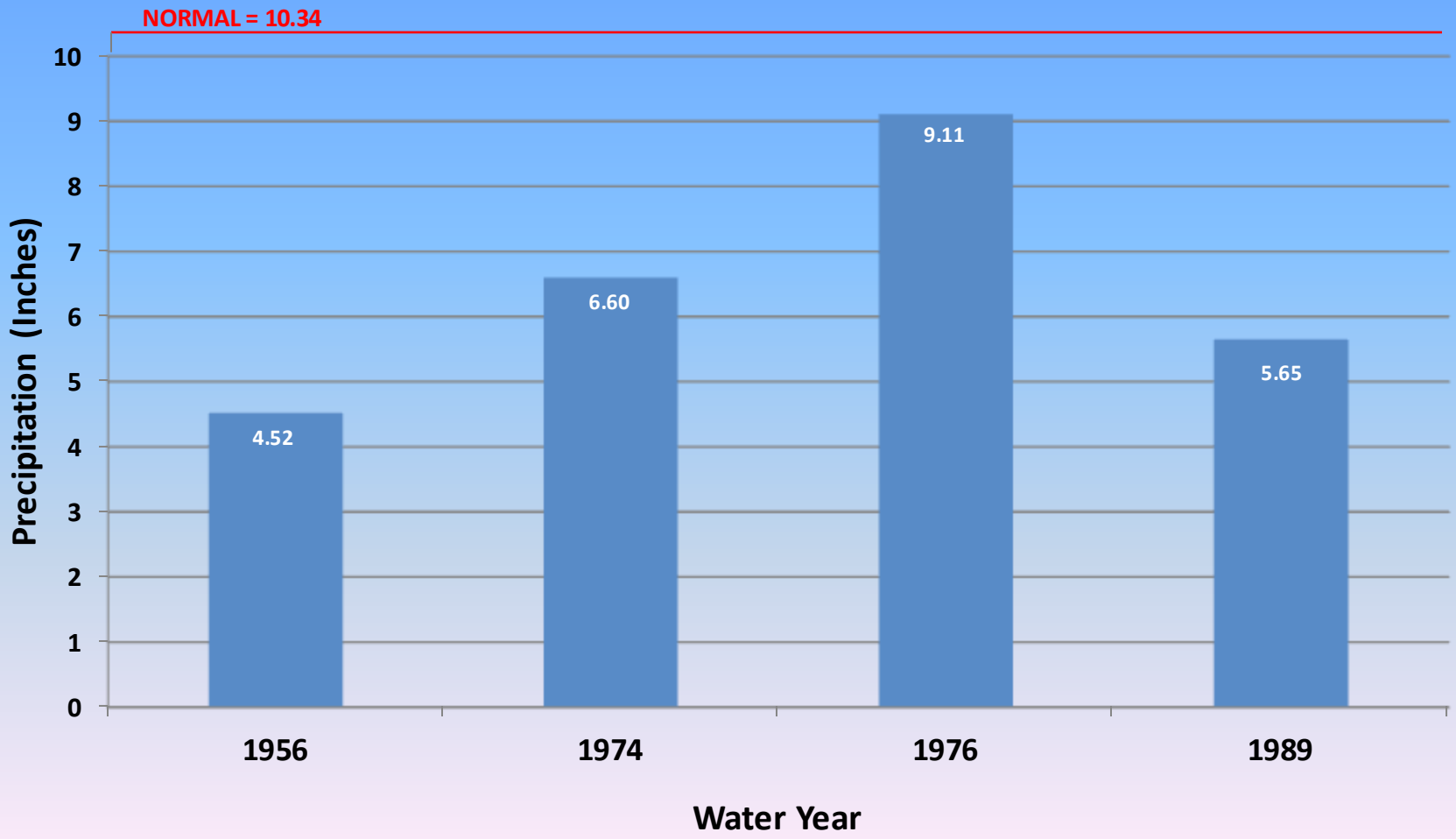
DETAILS

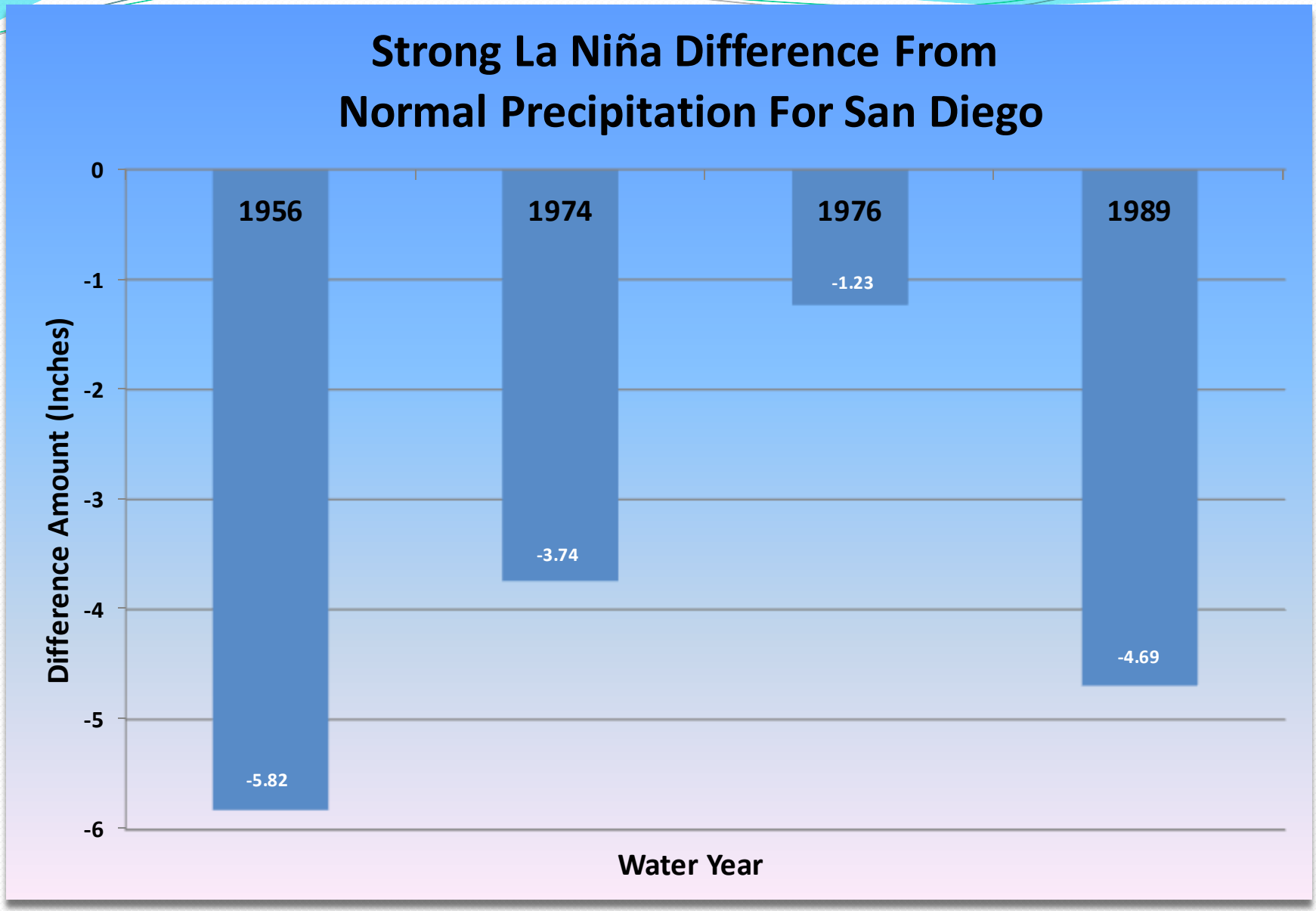
- In this study, the strength of La Niña is calculated from the Oceanic Nino Index (ONI). The threshold is further broken down into Weak with a -0.5°C to -0.9°C sea surface temperature anomaly, Moderate (-1.0°C to -1.4°C) and Strong (≥ -1.5°C). http://ggweather.com/enso/oni.htm

- Water year is defined as July 1st to June 30th. For example, water year 2011 would run from July 1st 2010, to June 30th 2011.

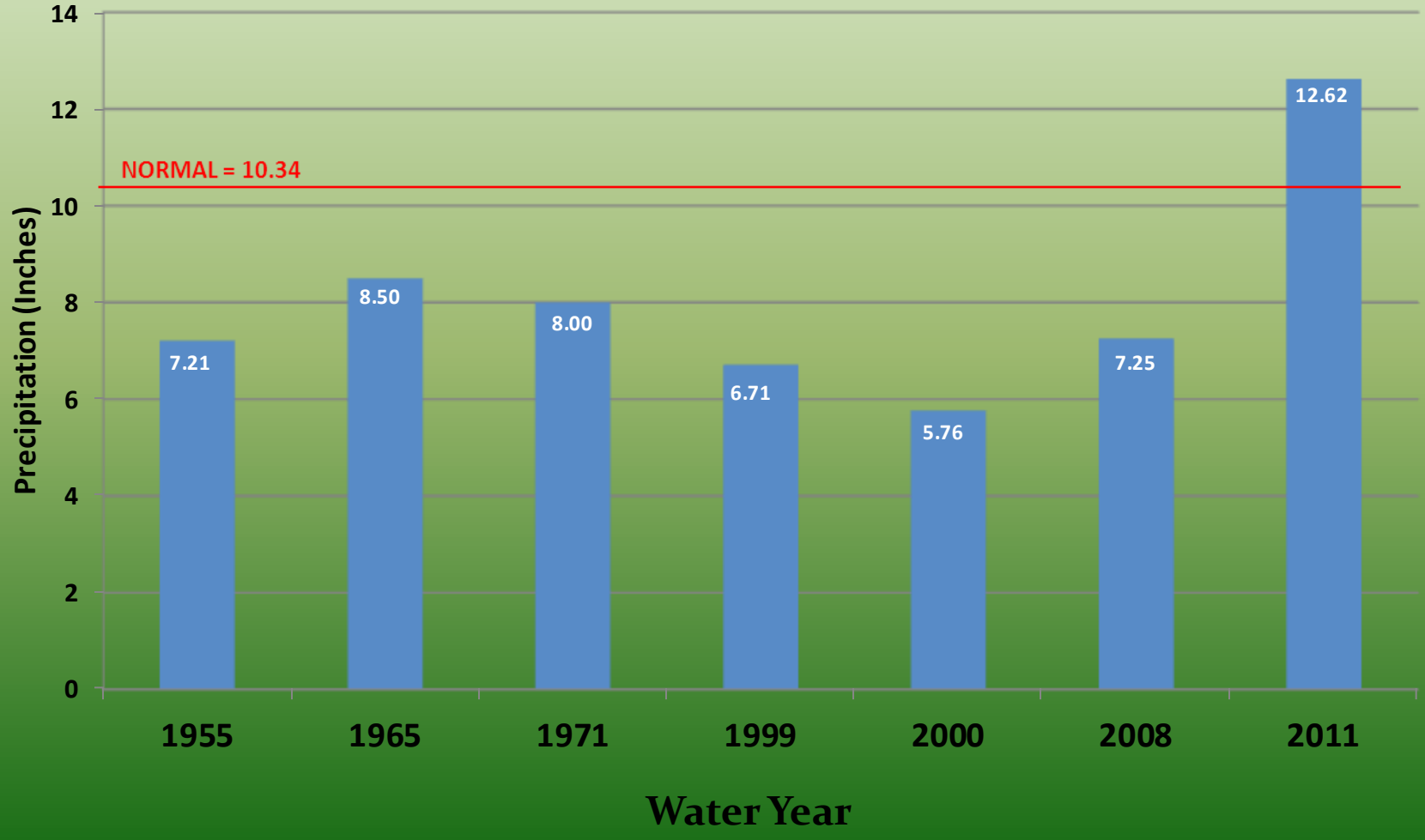
- Normal rainfall is computed as a 30 year average for San Diego (Lindbergh Field) from 1980 to 2010. The normal for this period is 10.34".

Yearly Precipitation For San Diego During A Strong La Niña

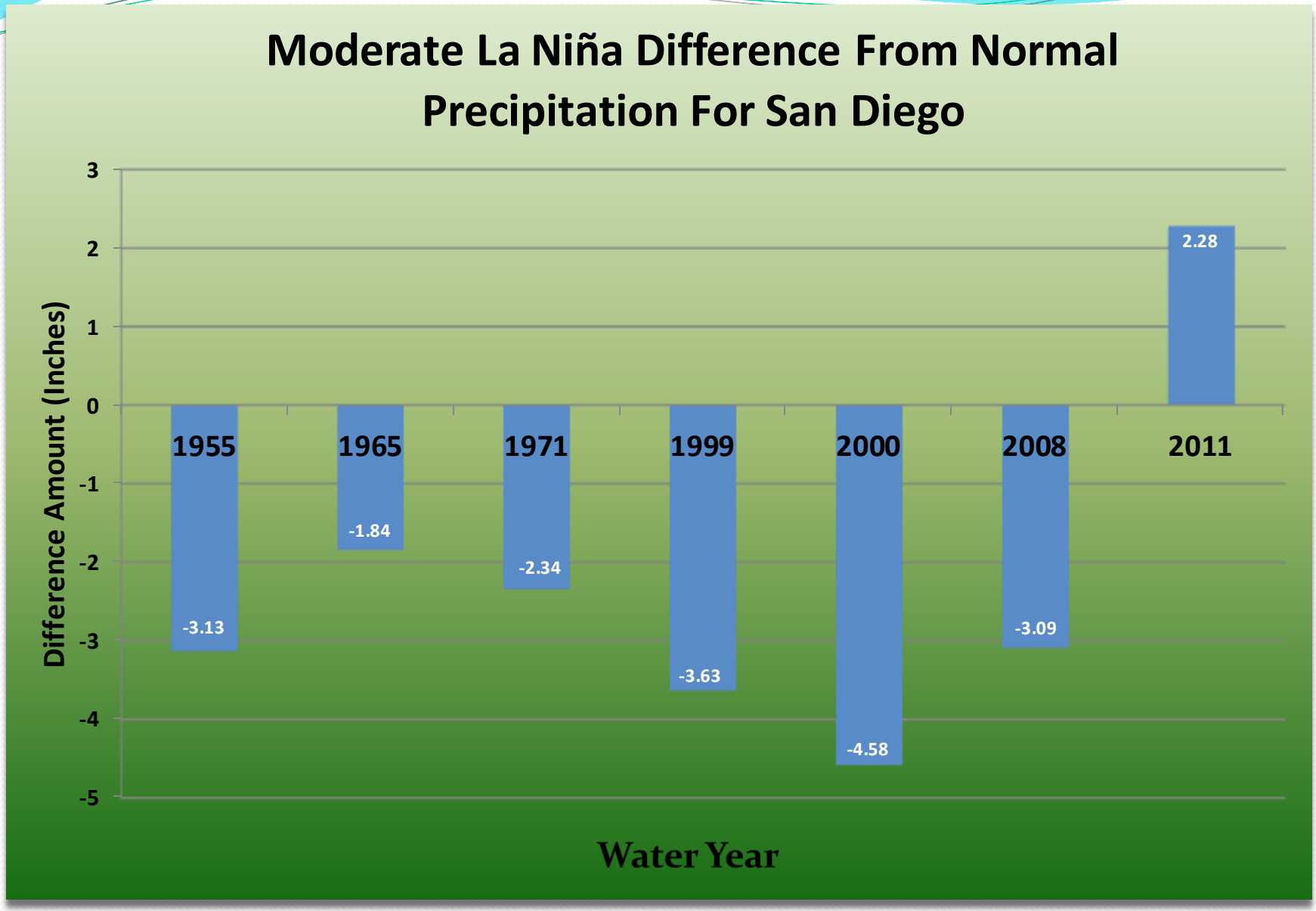



Strong La Niña Difference From Normal Precipitation For San Diego
0
-1
-2
-3
-4
-5
-6
Difference Amount (Inches)
1956
-5.82
1974
-3.74
1976
-1.23
1989
-4.69
Water Year

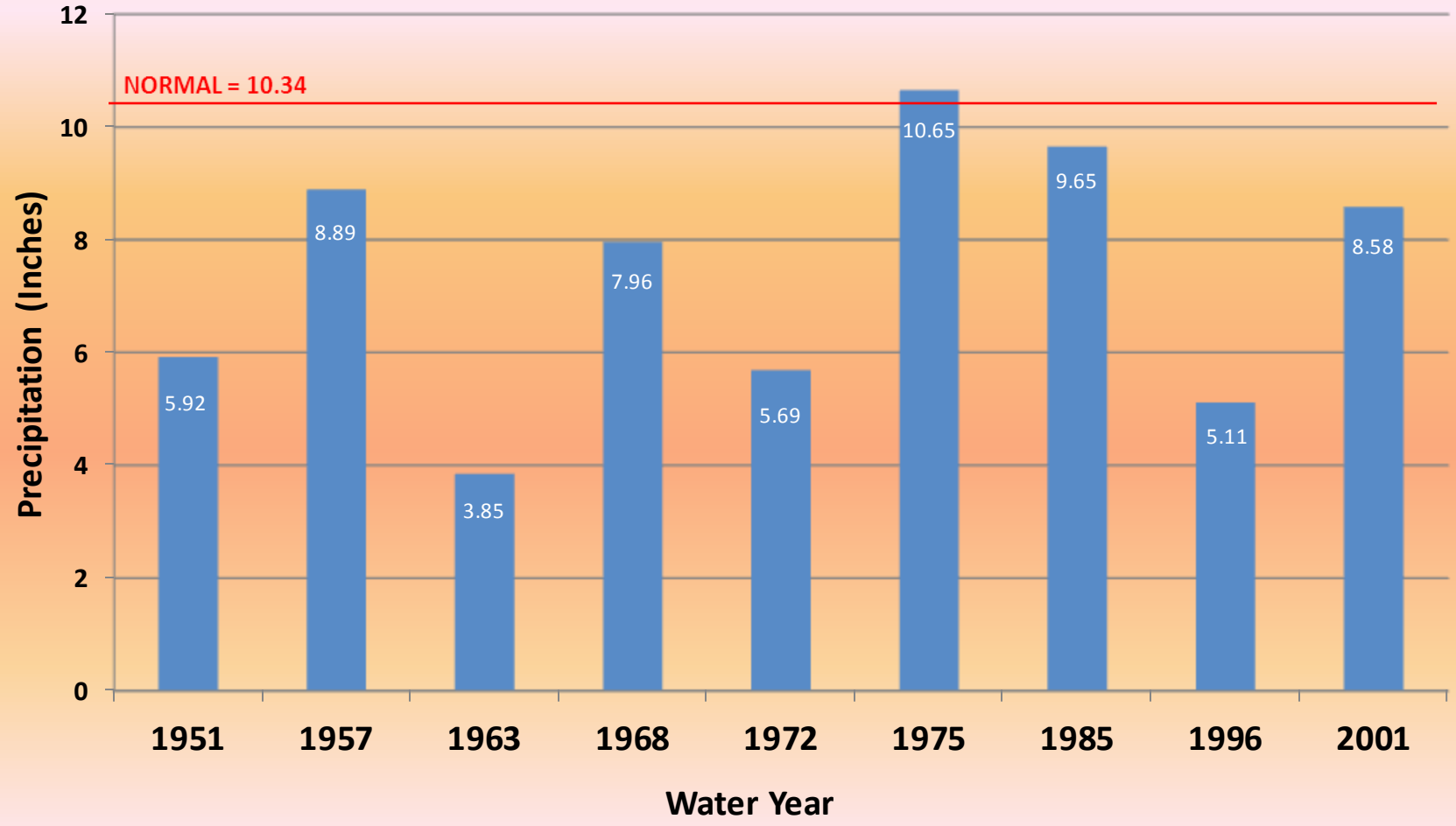
Yearly Precipitation For San Diego During a Moderate La Niña



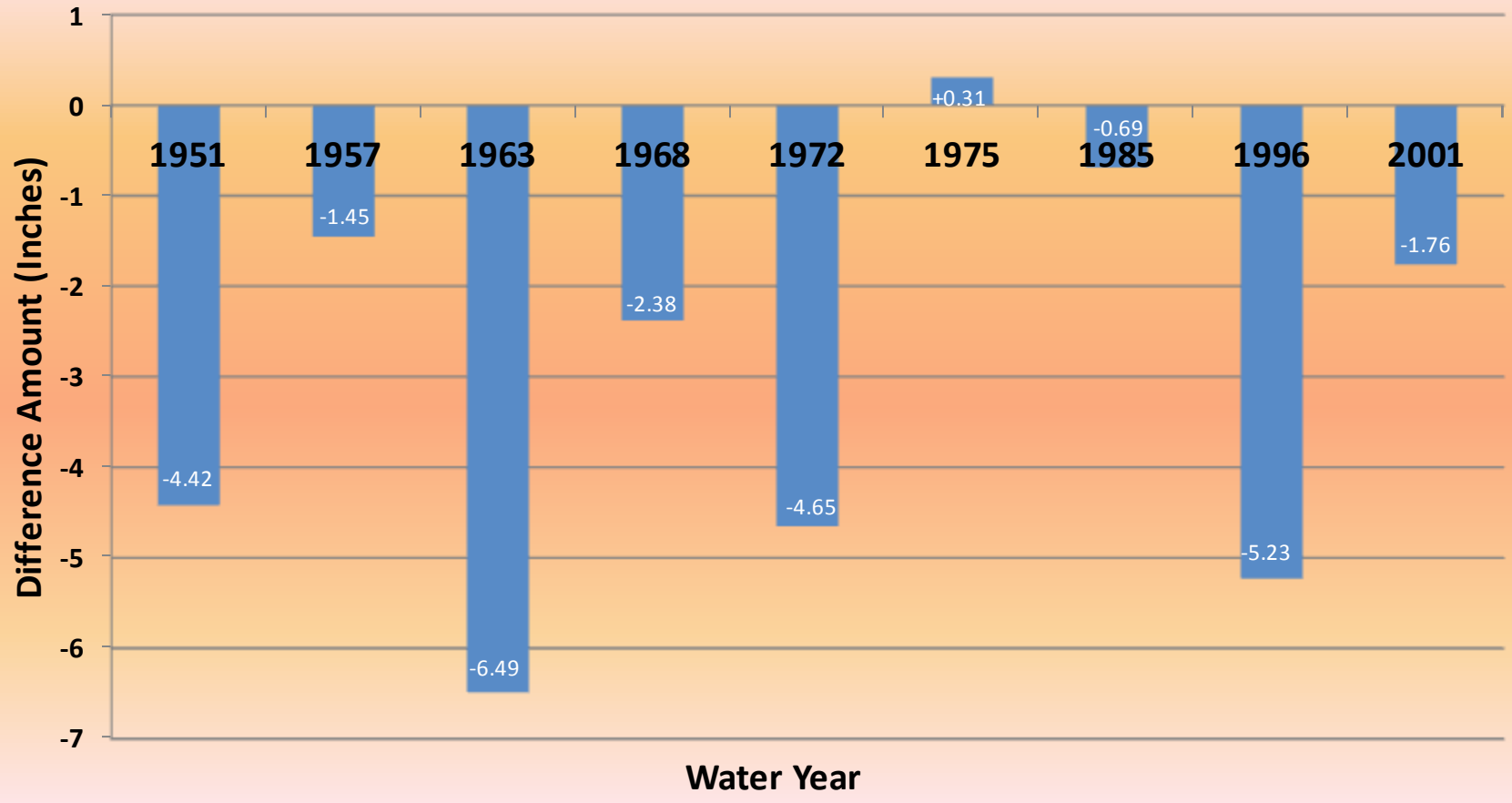
Moderate La Niña Difference From Normal Precipitation For San Diego



Yearly Precipitation for San Diego During A Weak La Niña



Weak La Niña Difference From Normal Precipitation For San Diego



La Niña Precipitation Averages for San Diego

La Nina	Water Year	Weak	Moderate	Strong
	1951	5.92		
	1955		7.21	
	1956			4.52
	1957	8.89		
	1963	3.85		
	1965		8.50	
	1968	7.96		
	1971		8.00	
	1972	5.69		
	1974			6.60
	1975	10.65		
	1976			9.11
	1985	9.65		
	1989			5.65
	1996	5.11		
	1999		6.71	
	2000		5.76	
	2001	8.58		
	2008		7.25	
	2011		12.62	
AVERAGE		**7.37**	**8.01**	**6.47**

San Diego average precipitation= 10.34

* Measured in inches

LA NIÑA AVERAGE MONTHY PRECIPITATION COMPARED TO NORMAL

	30-YEAR AVERAGE RAINFALL (NORMAL)	AVERAGE RAINFALL DURING LA NIÑA	PERCENT OF NORMAL
November	1.01	0.96	95%
December	1.53	1.25	82%
January	1.98	1.19	60%
February	2.27	1.40	62%
March	1.81	0.95	53%

*Measured in inches

CONCLUSIONS

- San Diego has experienced lower than normal water year precipitation in 18 out of the last 20 La Niña events (90% dry bias!).
- Note how the moderate La Niña of 2011 sticks out like a sore thumb. In all 6 of the previous moderate La Niñas, San Diego ended the water year with precipitation well below normal.
- During the water year of a weak, moderate, and strong La Niña, San Diego averaged 7.37", 8.01", and 6.47" respectively. These averages all fall below San Diego's 30 year rainfall average of 10.34".
- Based on the previous La Niña graphic, San Diego typically receives near average rainfall for November and December, but well below average January, February, and March.